SPECIAL REPORT

News

AT&T BRINGS THE INFORMATION SUPERHIGHWAY TO THE WORLD

By Lenora Vesio
with contributing
reporter Phil Chang

Pressed for time? You're not the only one. People throughout AT&T are working flat out to create a whole new way of communicating.

> "Today nobody knows more about networking— connecting one person to another—than AT&T"
>
> —Dick Bodman

The news media bill AT&T as "master builder" or "principal architect" of the information superhighway, and with good reason. No other company is more deeply engaged in the endeavor to create a worldwide information infrastructure, or better equipped to do the job.

It's a well-known fact: Of all the technology companies in the world, AT&T has the biggest complement of products and services for building and using the superhighway. AT&T offers communications and cable companies virtually everything they need to build high-capacity interactive networks. For businesses and consumers, governments, schools and hospitals, AT&T has a host of products and services for using the information superhighway, including the most advanced multimedia products and services. AT&T invented much of the technology that underlies the superhighway, and AT&T Bell Laboratories continues to create innovations that improve that underlying technology at a rate of a patent a day.

AT&T opinion polls show that when you ask 18-to-34-year-old Americans which company they associate with the information superhighway, more than half say, "AT&T." High-tech thought leaders, most from computer companies, recently voted AT&T most likely to be the leading supplier of home interactive technology.

Also, with three Baldrige awards and a Deming Prize, AT&T is widely acknowledged to be a quality company—a company that can be entrusted with this important endeavor.

"Today nobody knows more about networking—connecting one person to another—than AT&T," said Dick Bodman, AT&T's chief strategy officer. "The information superhighway is a dramatic extension of the networking that people don't even think about when they use public telephone systems.

"Eventually it will let people reach out from their homes or businesses to exchange informa-

tion in the form of voice, video, data and images in any combination they need, with no more effort than it takes to dial a phone call today," he said.

What's less known about AT&T and the information superhighway is the role AT&T people play in making it a reality. Whether driven by a commitment to meet customers' needs, which are urgent and challenging, or by the knowledge that today's superhighway work will help shape human destiny—or by the weight of short- and long-term responsibilities—AT&T people throughout the company are working flat out, while scrutinizing
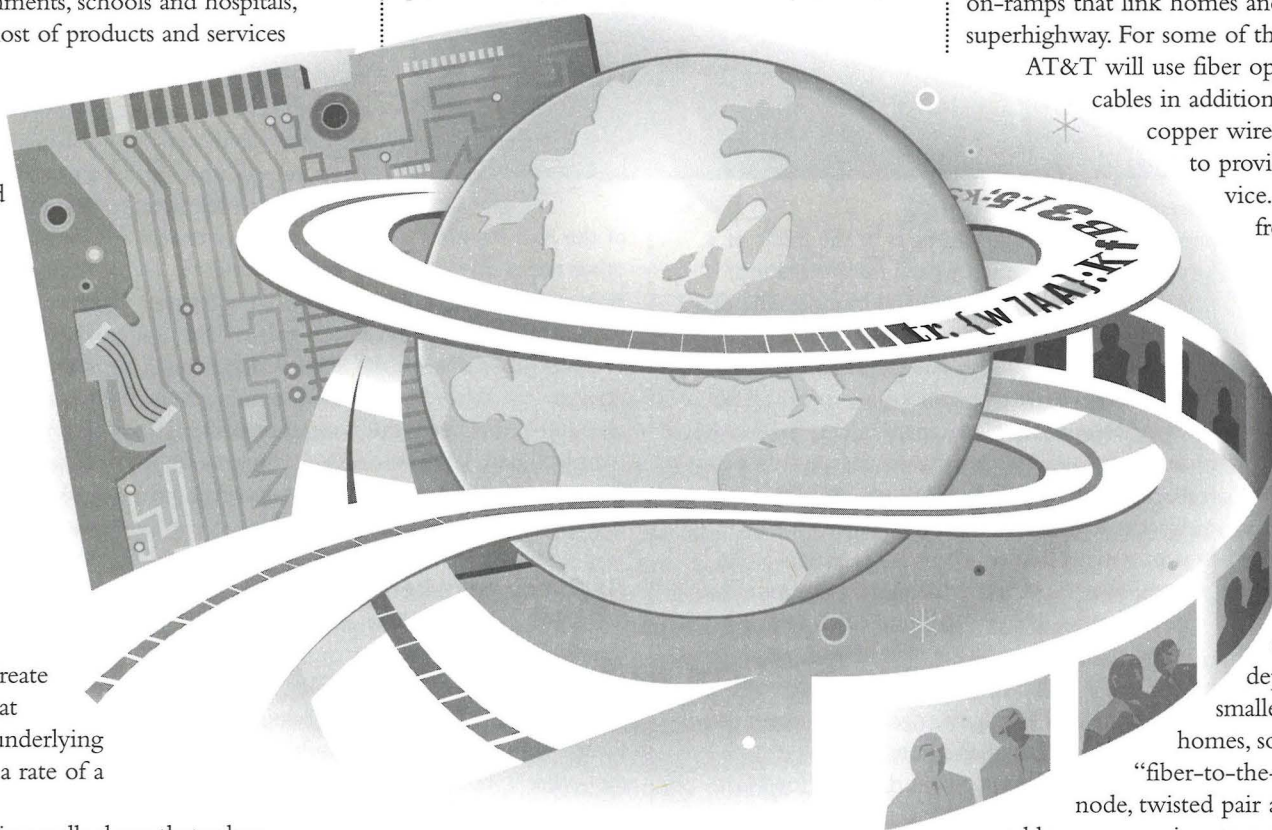
and changing their work processes to continuously improve quality and speed.

"We're working at a remarkable pace," said Greg Hughes, vice president, Professional Services Project Management, AT&T Network Systems Group. "I only wish we could go further faster."

Paving the Way

Virtually everyone at AT&T is involved in some aspect of superhighway work, and results have been impressive by any standard. Network Systems Group has won contracts totaling tens of billions of dollars since the end of 1993 to build superhighway infrastructure, both in the United States and abroad. The Saudi Arabian Ministry of Posts and Telecommunications this year selected AT&T to expand and modernize Saudi Arabia's

telecommunications infrastructure, a contract worth more than $4 billion, the largest in telecommunications history outside the United States. For this project, AT&T will double the capacity of Saudi Arabia's existing facilities, providing new local, toll and international services to the entire kingdom. The Saudi Arabia project is targeted for completion by the beginning of the next decade.

For U.S. customers Pacific Bell, Bell Atlantic, Southern New England Telecommunications (SNET), and SBC Communications Corp., work is heavily focused on "the last mile"—the on-ramps that link homes and businesses to the superhighway. For some of these projects, AT&T will use fiber optics and coaxial cables in addition to the twisted copper wire traditionally used to provide telephone service. Fiber will run from the central office, feeding into a node where optical pulses are converted to electronic signals. These nodes may serve an entire neighborhood of up to 500 homes, or they may be deployed closer to smaller clusters of homes, sometimes called "fiber-to-the-curb." From the node, twisted pair and/or coaxial cables carry services to and from network interfaces at each home.

These and other infrastructure contracts have been awarded in relatively quick succession and customer requirements are ambitious, to say the least. Pacific Bell wants to connect more than 1.5 million homes to its communications superhighway by the end of 1996, and more than 5 million homes by the end of the decade. The first phase of AT&T's work for SNET, now underway, will connect one-half million Connecticut customers to SNET's multimedia communications network. Bell Atlantic aims to upgrade infrastructure that will pass almost 6 million homes and, by the end of 2000, actually reach 8.5 million homes. For SBC Communications, the immediate goal is to trial video-on-demand and other interactive services, connecting as many as 47,000 households to the services by the end of 1996.

"Some people object to the term [information superhighway] on aesthetic grounds. They're just plain tired of hearing it. But I have to confess, I like it. There's a good reason why the highway metaphor has become so widely used. It's a form of shorthand for the collective expectations people all over the world have for what information technology can deliver. ...Part of the appeal of the superhighway is the image it gives of high-speed, high-volume traffic with easy access. A highway system like that expedites trade in goods between people in distant places. A global information superhighway should do the same thing for trade in information and services." —Bob Allen, chairman, AT&T
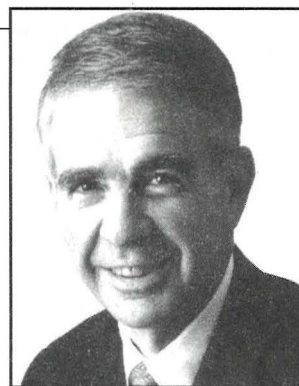
Learning New Skills

To meet these stringent requirements, the people of Network Systems Group are learning new skills, and learning to do things much faster than ever before, according to Carly Fiorina, president, Atlantic and Canadian Region, Network Systems Group. "It would be unrealistic to say that these huge successes do not at times put pressure on our business," she said. "This is not a slam-dunk. But, all in all, it's exciting. Most people in our business are invigorated by the change and the pace. And we're 100 percent confident that we can successfully meet our customers' requirements."

Network Systems Group is in the midst of a major structural and cultural transformation, moving from a functional and product-line orientation to a completely customer-focused orientation. With an official reorganization already announced and set to take place in early 1995, the change mirrors an approach that has proved to be successful with infrastructure customers Pacific Bell, SNET, Bell Atlantic and SBC Communications. "Instead of having a transmission systems unit or a switching systems unit, we're moving to multidisciplinary customer business units," said Greg Hughes. "We've been managing like this in our broadband business, and it works. By bringing an entire team close to the customer, and letting the decisions happen there, we're more focused and faster."

"This is a whole new world," said Joe Hart,

Strategic Services Unit vice president, Network Systems Group. "Customers want to rebuild in five years what we've supplied and serviced for the last 50 years. We just can't do it with the old processes. They're too slow. Project teams have got to have the ability to make commitments and place orders and deliver products and services on a whole new scale—quickly. Whether the customer is in California, Saudi Arabia or Ukraine. Time and distance shouldn't have an impact on our ability to meet customers' needs."

Besides building superhighway infrastructures in the United States and other countries, AT&T also is the world's leading full-service provider of undersea communications systems—the infrastructure that connects nations around the world. To date, AT&T Submarine Systems' fleet of six cable ships has installed more than 230,000 kilometers of undersea communications cable, enough to circle the equator more than six times. In just the past three months, AT&T Submarine Systems has announced its partnership in two new major undersea cable contracts, one to provide the northern segment of the Asia Pacific Cable Network, and the other to install the FLAG (Fiberoptic Link Around the Globe) cable system—the longest submarine cable system in the world. The unit also recently activated the AMERICAS-1 fiber-optic cable system, a $235 million undersea cable connecting the United States, Virgin Islands, Brazil, Trinidad and Venezuela. AT&T Submarine Systems was the lead construction contractor of AMERICAS-1.

Anytime, Anywhere, Any Kind

To help customers take advantage of the tremendous bandwidth, or capacity, that the information superhighway offers, AT&T has introduced an array of new products and services, many of which offer multimedia capabilities—that is, the ability to simultaneously send or receive two or more media, such as voice, data, or video images. (See below.) The challenge in these endeavors is to make two-way multimedia communications at least as easy to use as voice communications are now, according to Alex Mandl, executive vice president and

chief executive officer, AT&T Communications Services Group.

"At AT&T we believe the future of communications will be built around video and data dial tone," Mandl said. "We've been striving for anytime, anywhere communications. Now we're adding 'any kind' to the list."

This year AT&T introduced AT&T *WorldWorx* Solutions, a series of products and services that bring people together in ways not possible before, allowing them to see one another, talk to one another, and share files and data. Designed for business and institutional use, AT&T WorldWorx Solutions are available in the United States and 22 other nations in Asia, Europe and South America. AT&T is packaging applications for WorldWorx in areas such as distance learning, remote access to experts, customer sales and support, and collaborative work teams.

"AT&T WorldWorx Solutions is the beginning of the evolution toward placing multimedia communications squarely at the customers' fingertips," said Roy Weber, chief technical officer, New Concepts, Business Communications Services.
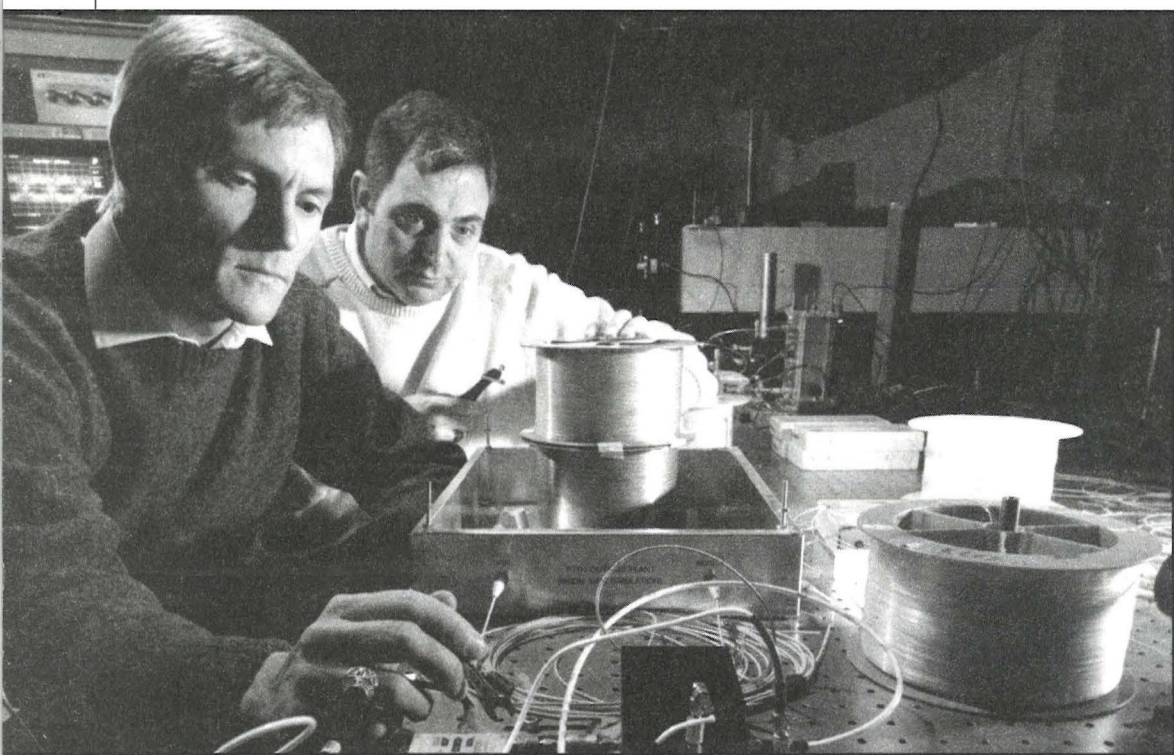
To make AT&T WorldWorx Solutions work across computing platforms, Apple, Hewlett-Packard, IBM, Intel, Lotus, NEC, Novell, PictureTel, Sun, VideoServer and Xerox joined AT&T in announcing that they will cooperate to make video and data sharing service from a desktop computer an easy-to-use and ubiquitous office tool.

WorldWorx Network Services, part of the AT&T WorldWorx Solutions offer, are already in use by U.S. healthcare providers, universities and businesses. Bassett Health Care in upstate New York uses WorldWorx Network Services to provide patients in rural areas with access to specialists and ancillary medical care providers. Doctors can discuss and annotate patient charts, EKGs, CAT scans and other diagnostic tools. Doctors and medical students also will be able to take advantage of these capabilities for distance learning.

AdminiStar Inc., a division of the Associated Group insurance company, is planning an executive support system that will not only enable users to teleconference and work on applications simultaneously, but will allow them to share and discuss breaking news from their news-wire feed—or even from Cable News Network.

Doing Business A New Way

AT&T also has been working to make collaboration among businesses easier by introducing networking capabilities to existing business software environments, such as the popular Lotus Notes® "groupware," a tool for workgroup collaboration used by 3,200 companies

Tom Wood (foreground) of the Photonics Research Lab in Holmdel, N.J., and George Bodeep, of the Communications Systems Research Lab, in Holmdel, test a design for boosting the capacity of fiber loop systems.

A Sampling of the Latest AT&T Multimedia Products and Services

AT&T Network Notes —
Based on Lotus Notes, this new service makes the widely used Lotus Notes software available to businesses on AT&T's public network.

For Information, call:
800-204-2764

AT&T NetWare Connect Services —
Offered through an alliance of AT&T and Novell Inc., these new services will use AT&T's and Novell's latest directory service and internetworking technologies to form a global network of business networks, giving businesses the ability to share applications easily and to communicate with partners and suppliers.

For Information, call:
800-204-2764

AT&T PersonaLink Services —
Intelligent Agent-assisted multimedia networking.

For Information, call:
800-936-LINK

"'Information superhighway' is the single most moronic term to come out of Washington, D.C., in the past 100 years. It is a terribly inept metaphor that works on some levels, but mostly does not work. In 50 or 100 years, we'll look back and realize that closer metaphors are biological and not industrial." —Paul Saffo, director, *Institute for the Future, Palo Alto, Calif.*

To hear customers tell it, AT&T is not just the right choice, but the only choice, when it comes to hiring a supplier that can be trusted with billions of dollars and your very future. "We faced many challenges before selecting AT&T," said Tim Harden, vice president and chief operating officer of Pacific Bell's broadband initiative. "We chose AT&T because it would invest to ensure it would happen, with money, with R&D, and by taking risks with Pacific Bell. We selected AT&T as a partner."

"We're in an industry right now which no longer can afford generic solutions. We need the ability to get things tailored down to our requirements so that we can offer the services that are attractive at an affordable price," said Charlotte Denenberg, vice president, science and technology, Southern New England Telecommunications. "AT&T is certainly the supplier of choice right now. They're one of the few players in the equipment business who has the ability to keep pace with the tremendous and constant changes in our industry."

AT&T has built more than business while constructing the information superhighway. By creating cross-disciplinary teams that are dedicated to a single customer and that work side-by-side with the customer to solve problems, AT&T Network Systems Group has built up deep "trust accounts," where customers rely on AT&T not just for products and technology, but also for strategic planning that will improve their balance sheets and foster success in the marketplace.

"We offer a much broader value proposition than anyone else out there," said Carly Fiorina, president, Atlantic and Canadian Region, Network Systems Group. "Some companies can do pieces of the technology. Some can do pieces of the systems integration. Others can do pieces of the financing. But no other company can pull it all together and stand shoulder to shoulder with customers, share the risk with them, and turn over a total system that will really deliver against their business issues."

"We put together end-to-end solutions for customers in a way that no one else can," said Bob Clark, president, Pacific West Region, Network Systems Group. "With technology, support and financing, our solutions allow it all to be real and 'doable' right now."

Mal Buchner Jr., Transmissions Systems vice president, has worked with Network Systems Group's broadband customers during the past year to engineer the electronics and software that are part of the total solution. "Working with these customers has been a more intense business experience than any other I've been through," he said. "But once you get a little sleep, you feel very good about it. We're not developing something that we think the customer needs. We're working closely with customers to create the right solution together, as a single team."

"In doing so, we've made a number of friends," said Buchner. "Our customers have put first-class people on these projects, and we've been fortunate enough to be able to assign some very fine people to work with them. We all work so frequently, so closely, so intensely together, that we actually get to know each other very well. It's been fun."

worldwide. In March 1994, AT&T and Lotus Development Corp., announced plans to make Lotus Notes available on AT&T's public network. The new service, called AT&T Network Notes, will let users communicate, work together and access information better than before by extending their electronic relationships beyond traditional company boundaries. Through AT&T Network Notes, business partners, suppliers and customers can collaborate on the preparation of documents that include text, still images and video.

AT&T and Novell announced a similar alliance in May 1994 that combines the ease-of-use, security and connectivity of Novell's NetWare® with the quality, performance and reliability of the AT&T network. Called AT&T NetWare Connect Services, the AT&T-Novell offering will use AT&T's and Novell's latest directory service and networking technologies to form a global network of business networks.

"These new services have the potential to change the way businesses do business, much as AT&T changed business when it introduced 800 Service 27 years ago," said Mandl. "Colleagues will be able to collaborate across distances as if they were in the same room."

"The information superhighway is more than surfing through 500 channels," said Jim Cosgrove, vice president and general manager, Business Multimedia Services, Business Communications Services. "It's offering a new way of doing business, with massive productivity gains.

"Take, for example, a computer firm with a product cycle of eight months," he said. "Now it takes one month to put literature in envelopes and mail it to value-added resellers (VARs). With AT&T Network Notes, you can give the information to VARs overnight, saving a month in the product realization cycle. That's a major competitive advantage."

Waring Partridge, vice president, Multimedia Services, Consumer Communications Services, believes that the information superhighway will improve communications in every aspect of life, from business to entertainment to shopping.

"We're not going to change what people eat or wear, or what kind of shelter they have," said Partridge. "We're simply going to make doing familiar things easier."

More Mobility

For one thing, Partridge points out, communications will not be restricted by wire. "This is what our purchase of McCaw Cellular is all about," he said. "There has been explosive growth in the cordless and cellular markets. This growth will continue so we will have even more mobility than we have had in the past."

The huge bandwidth of the superhighway also will make multimedia communications and information retrieval far more natural and affordable. "When you have this kind of bandwidth, you can send a lot of information fast," said Partridge. "We'll keep in touch with family members visually, and we'll work in a collaborative environment as if no distance existed—even though we may be a thousand miles apart.

"And with offerings such as AT&T *PersonaLink* Services, a lot of useful information will be brought into situations automatically, without our having to ask for it," he said.

PersonaLink Services, announced earlier this year, form a platform for an electronic community where people can exchange messages, work and play, and where creative companies and individuals can offer products and services to subscribers. PersonaLink Services are the first to use mobile "intelligent assistants," software that can be programmed to know what kinds of information a user wants and where to get it. For example, an intelligent assistant can filter and direct incoming mail, and search electronic directories. In the future, intelligent assistants will be able to comb databases, such as the Dow Jones News Service, to find items about the industries where its client has invested; make airline reservations or, working with other customers' intelligent assistants, schedule a meeting.

"With new capabilities, such as AT&T PersonaLink Services, the superhighway will give people more control," said Gordon Bridge, president, AT&T Consumer Interactive Services. "These services will help people manage the information overload they experience today, and help them get only the information they really need and want, more efficiently."

Partridge believes the information superhighway will bring people more and better entertainment options as well. "Watching television will be very much like putting in a video disk," he said. "People will be able to be more selective: to skim and scan, to fast-forward, to go back.

"Entertainment will be on demand, giving people freedom of choice with respect to time and content," he said. "But you won't have to leave your home to have this kind of freedom. You won't have to go to a video store.

"And it will be technically possible for people to interact with entertainment content—for example, to change the ending or course of a movie, or to participate in a music video," Partridge said. "Whether people want to do that

AFRICA ONE ▼

A Proposal to Help Strengthen a Continent

A confluence of political, economic and technological developments has inspired AT&T Submarine Systems, with the support of the International Telecommunications Union, to propose the Africa ONE project, a regional network that would connect all the nations of Africa, one to another and to the rest of the world, using state-of-the-art technology to create a vital link to regional and global markets. The network would consist of an undersea fiber-optic cable forming a ring around the entire continent to which all coastal countries would have independent access and to which all internal countries would be linked through other technologies (satellite radio). T man by pr architect tem "Pe
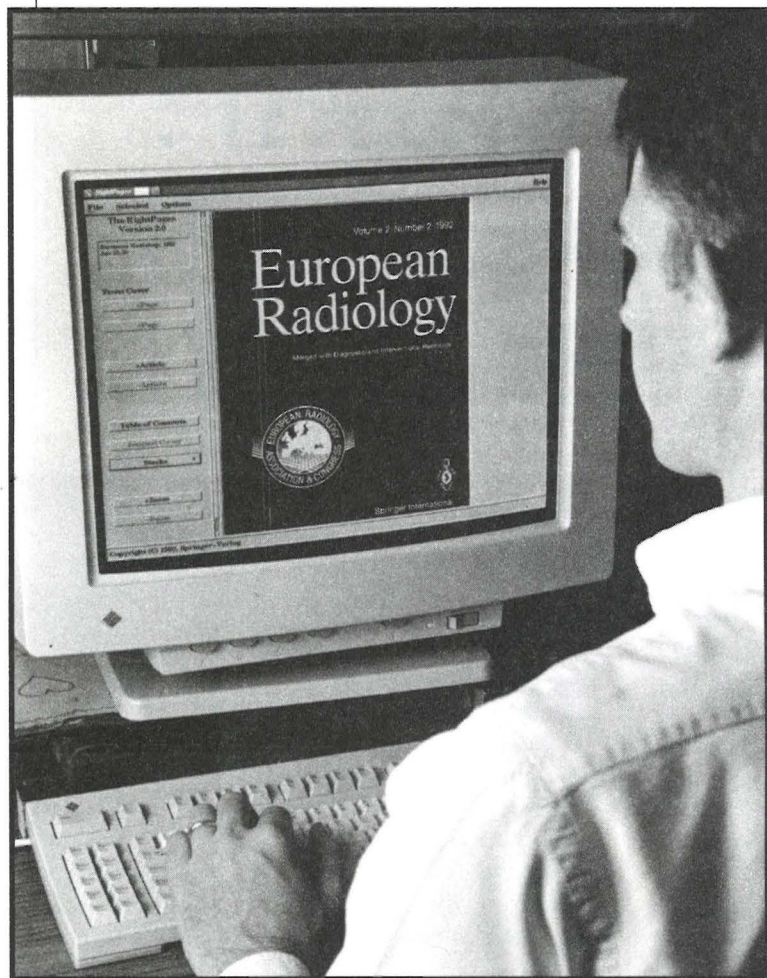
> "The highway is only useful if someone travels it. What will make the information superhighway come alive is exciting and interesting experiences, not just content."
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> —Gordon Bridge, president, AT&T Consumer Interactive Services
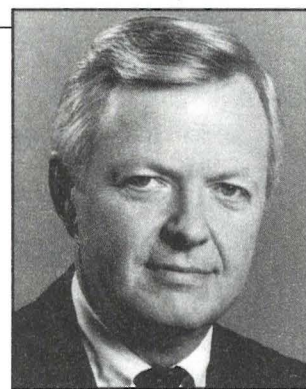
AT&T RightPages, an experimental system created at Bell Labs, provides on-line access to published documents.

is an open question."

Already, interactive entertainment services, such as the ImagiNation Network™, recently purchased by AT&T, let people meet and form relationships through games and other activities they enjoy together over the network.

"The ImagiNation Network fits their tagline," said Bridge. "They are changing the way the world makes friends."

Jim Barton, chief technology officer, Interactive Digital Systems, a joint venture of Network Systems Group and Silicon Graphics, predicts that broad deployment of the information superhighway will have a profound social impact.

"The superhighway offers the potential to change society on a broad scale," he said. "It provides a way to directly influence government through votes, and a way for citizens to get a lot more information about what's really going on.

"The superhighway also will help address environmental issues and people's intensifying need to balance personal and professional dimensions of their lives," said Barton. "People will work at home— or wherever they need to. They won't be tied to a desk."

Testing the Water

To find out what people really want from the information superhighway, AT&T is testing products and services with consumers and businesses, and using customer feedback to shape future AT&T offerings.

AT&T Consumer Video Services last year completed a trial of interactive video services in Chicago that tested entertainment, shopping, educational programs, news and information services in 50 homes of AT&T employees. Employees used the services for about nine months and provided insights into what they liked and why.

"The most successful applications were those that entertained, informed and allowed people to communicate or to do a transaction," said Vinnie Grosso, AT&T Consumer Video Services vice president, Multimedia Products and Services. "Consumers are our toughest critics. So whatever the superhighway becomes when they turn it on better be valuable. That means it should be fun, serve a purpose, or, more likely, both."

Working with partners Viacom International and GTE Telephone Operations, Consumer Video Services is planning trials in California and Virginia using a sophisticated interactive television system built by Bell Laboratories.

"We're trying to discover what applications consumers want and how they actually use them," said Grosso. "And we're trying to deter-

mine what it takes in the way of software and hardware to make it all work."

On the business side, market research has helped Business Communications Services understand how businesses want to operate in the future, and how they want communications technology to help them. Called Plan 2000 because the opinions of 2,000 business customers have been collected and analyzed to date, the market research has yielded important insights that already are being incorporated into AT&T products and services for businesses.

"This research is really ongoing," said Roy Weber, chief technical officer, New Concepts, Business Communications Services. "And we're not just talking to telecommunications managers. We're talking to CEOs, business unit heads and salespeople. We're asking them how they want their businesses to run in the future —how they want their hotels, airlines, manufacturing operations, print shops, or whatever—to operate.

"We're not trying to sell them anything yet," said Weber. "We're there to listen. And we're learning what excites people, and what concerns them, when they look at what's possible."

As part of the Plan 2000 broadband multimedia research, a multi-vendor broadband application testbed for business products and services has been set up at Bell Laboratories in Holmdel, N.J. There, customers' new service concepts and applications are being tested, and prototype applications are being run on a mix of computers and network equipment which mirrors the "real world."
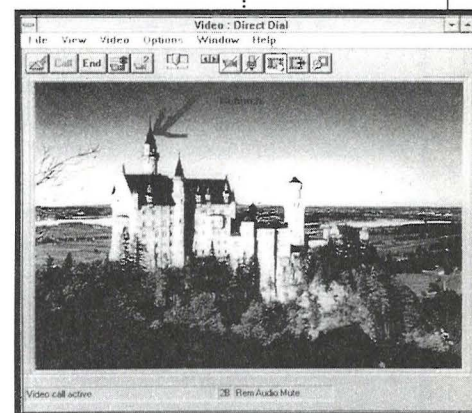
"We're showing what's possible based on today's affordable technology," said James Yee, a member of technical staff at Bell Laboratories. "And many customers want the things we're showing them—now. Particularly those who deal in high-stakes financial markets where time is money."

Public Policy Challenges

While AT&T works to deploy the information superhighway with high-bandwidth infrastructure and products and services

that take advantage of the bandwidth, AT&T people in Washington, D.C., and elsewhere are working to influence public policy and industry regulation. Their efforts will help create an industry structure that will bring the highest-quality information superhighway technology to businesses and consumers as quickly as possible, in a way that maximizes American economic growth.

"We're working in a business that is in the best position to advance this country and benefit society," said Woody Kerkeslager, vice president, Federal Government Affairs. "When Vice President Gore visited Bell Labs last year, he

The AT&T Vistium Solution lets people video-conference and share files from the desktop.

terrestrial cable and e network would be ed on a regional basis n African regional uthority.

Nelson Marshall, senior vice president and chief operating officer, AT&T Submarine Systems, is T&T's key representa- e for the Africa ONE ect, and one of the of the proposed sys- aps no other area of

the world holds as much promise, or exciting possibilities, for economic growth and advancement as the continent of Africa," he said.

"Telecommunications will be an essential part of the infrastructure required to convert the vast potential into solid economic progress benefiting the nations and people of Africa."

Marshall said that construction of Africa ONE will begin in 1996. The network is expected to be fully operational before 2000.

> "The information superhighway metaphor may be a dead end. It suggests some giant public works project. In fact, industry will build the information networks of tomorrow. But their impact on our lives probably will be on a scale akin to the highway projects of the '50s and '60s. Just as the U.S. highway system gave rise to the suburbs and exurbs, new networking capabilities will allow people to build new communities in cyberspace. The Internet is just the precursor of that."
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> —Alex Mandl, executive vice president and chief executive officer, AT&T Communications Services Group
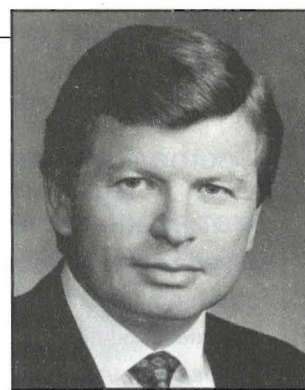
DO WE NEED AN
INFORMATION SUPERHIGHWAY?

An AT&T video entitled "Where's the On-Ramp," about the information superhighway asks passersby, "Where can I find the on-ramp to the information highway?" Replies reveal some confusion about what the information superhighway is and why we need it. Some people don't have a clue. "Take a left on Houston Street, and keep going straight," was one reply. "Gee, I'm not sure," another said. "I've been there a million times, but I can't remember. Ask the doorman." Still another said, "It's like that game where each person says a message to the next person. And in the end, it's all screwed up."

All screwed up is right, some might say. Why build the information superhighway if the average person doesn't even know what it is?

Good question. The answers are compelling and range from the purely pragmatic (to serve customers well and to make money) to the startlingly philosophical (to save the human species from extinction).

"The customer is more important than anything," said Curt Crawford, president, AT&T Microelectronics. "Unless someone buys something that you sell, then the rest of the things you do are irrelevant."

Customers are buying.

Doing Business Differently

On a global basis, telephone and cable companies spent $5 billion this year to upgrade their networks and develop and test consumer video applications. By 2001, AT&T Network Systems Group estimates that this broadband market alone will grow to $32 billion annually. "That doesn't even begin to count the potential market for professional services, consulting and systems integration," said Rich McGinn, chief executive officer, Network Systems Group.

This is more than a "build-it-and-they-will-come" phenomenon. With a projected average annual growth rate of 17 percent, AT&T's other target markets—networked computing, wireless communications, messaging, visual communications, and voice and audio processing—are among the fastest growing in the industry. Businesses and consumers are demanding the best technology available, and the more they understand and experience the benefits, the more they want.

Jim Cosgrove, vice president and general manager, AT&T Business Multimedia Services, Business Communications Services, said, "We are seeing a new age of electronic commerce that's on the order of the industrial revolution. Companies are coming to us in pairs or triplets, trying to define ways in which they can use information technology to work together and gain a competitive advantage."

"This is radical," continued Cosgrove. "Businesses will do business differently, with massive productivity gains, because intercompany communication will break down barriers to efficiency."

"From a business point of view, there is real willingness to pay real dollars for superhighway technology," said Roy Weber, chief technical officer, New Concepts, Business Communications Services. "If that technology lets me as a business make a decision faster, or bring a product to market one or two months earlier than my competitors, there's value."

"Excuse me, I'm lost. Can you direct me to the information superhighway?"

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With On-ramps, Services Will Take Off

"Existing services, such as the Internet, have grown in popularity, but leave consumers wanting," said Pat Parseghian, a member of technical staff, AT&T Bell Laboratories and one of the creators of XUNET, an experimental high-capacity interactive network that spans the country and includes a number of universities and research laboratories. "There is a growing level of frustration with the capabilities of the Internet," she said. "For example, reliability and security cannot be taken for granted."

According to Alex Mandl, executive vice president and CEO, AT&T Communications Services Group, the long-distance superhighway is built, but the on-ramps that connect the superhighway to homes and businesses are still under construction. "Once the on-ramps are deployed, we can bring expanded superhighway capabilities to customers," he said. "We'll see services, such as video telephony, take off."

According to Chris Harrington, Strategic Planning Director, Communications Services Group, frustration with current communications capabilities and demand for the most sophisticated communications services available may have roots far deeper than businesses or nations wanting to be more competitive and consumers wanting all manner of high-tech wizardry at their fingertips to save them time and trouble.

"People agree that when you have this sophisticated technology, you have a better economy and a better standard of living," said Harrington.

"Some philosophers would argue that we're not really in this because we're in business; we're in this because we're following the great evolutionary mandate of our species. In other words, the information superhighway is actually the first inkling of a new form of intelligence that's evolving on this planet—a cooperative intelligence that can do more than a single intelligence can do alone. We're building a nervous system for the entire life system on the planet."

As for those who have never heard of the information superhighway, chances are they will become aware of it soon.

"The superhighway will emerge in late 1995, or early 1996, and quickly spread thereafter," said Tim Harden, chief operating officer of Pacific Bell's broadband initiative. "In three to five years, we will have a very different communications environment that will dramatically change the way we live and work."

The broadband on-ramps that AT&T is helping Pacific Bell and other operating companies deploy will give homes 700 megahertz of communications capacity. (Today a pair of copper wires with ISDN capabilities gives customers a capacity of only 324 kilobits.) With 700 megahertz of bandwidth, Harden says, "it will be possible for your child to be playing a video game with a friend in another state while you take a video telephone call, your spouse does some home shopping using interactive television, another child uses an on-line information retrieval service, and you receive a fax. That's the superhighway."
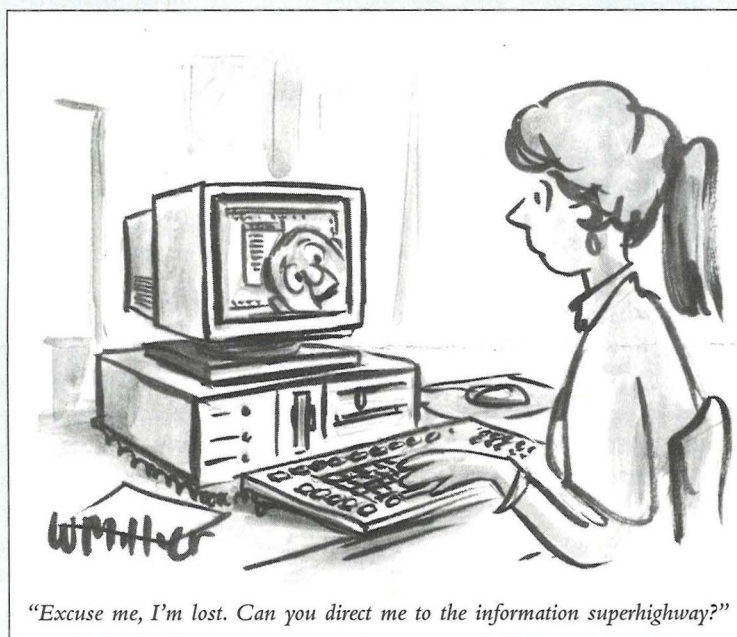
"The term 'information superhighway' is now part of our national vocabulary. The analogy is compelling: The construction of our national railroads, highways and airports supported America's economic growth over the last century. Our national information highway system will support growth in the next. Once our economy rested primarily on the transport of goods; today and tomorrow it will rest more and more on the transport of information."

—Waring Partridge, vice president, Multimedia Services, Consumer Communications Services
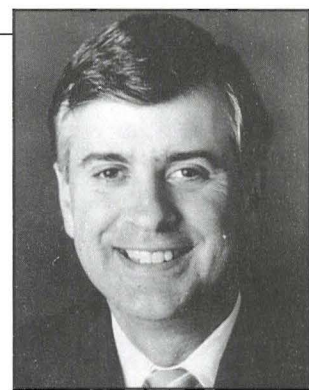
acknowledged how important AT&T is to American competitiveness."

But some major public policy challenges for AT&T remain, according to Kerkeslager. First and foremost, AT&T is lobbying hard to open local telephone service markets to competition before local phone companies are allowed into the long-distance business.

Competition in the long-distance market has

With the AT&T Intuity System, users on a PBX can create data, voice and video messages.

brought tremendous benefits to U.S. consumers. Since the breakup of the Bell System in 1984, the long-distance industry has saved Americans $240 billion, enough to wipe out the 1994 federal deficit. (AT&T's long-distance prices have declined by an average of 64 percent overall since 1984.) Meanwhile, the quality, variety and sophistication of long-distance services have been skyrocketing.

The local telephone service market is about $20 billion a year bigger than the long-distance market in the United States; therefore, competition in the local market is expected to bring substantial savings as well.

"The long-distance superhighways are built and getting better," said AT&T Chairman Bob Allen. "The time has come for government and the telecommunications industry to make [local competition] happen. The net result for the United States will be a vastly expanded superhighway offering more and better options for using information technology."

Guaranteeing Access

Experts inside and outside AT&T agree that an information superhighway that is easily accessible by businesses and consumers is key to America's competitiveness. State governments across the nation are making the deployment of "intrahighways" a high priority to expand state education systems with distance-learning capabilities. North Carolina and Maryland recently signed $150 million and $30 million deals, respectively, with AT&T Data Communications Services, for dedicated superhighways based on

Synchronous Optical Network (SONET) technology, and AT&T is working with a half-dozen other states that are developing plans for statewide superhighways.

"State governments view this technology as a critical differentiator in attracting business," said Mike Robinson, Data Communications Services product marketing manager. "The first applications will link rural areas with the best educational institutions and educators in each state. The goal is to develop highly educated workforces."

"It's very hard to find any industry today that isn't enabled by communications, software and semiconductors," said Chris Harrington, strategic planning director, Communications Services Group. "Whether you're looking at agriculture, manufacturing, or you name it. We are entering the age of the hidden computer."

"This is not a matter of guaranteeing the right to play video games," Vice President Gore told a group of entertainment and information industry executives who attended the Information Superhighway Summit in Los Angeles earlier this year. "It is a matter of guaranteeing access to essential services.

"By taking the lead in quickly employing these new information technologies, America's businesses will gain enormous advantages in the worldwide marketplace," said Gore. "That is important, because if America is to prosper, we must be able to manufacture goods within our borders and sell them not just in Tennessee but in Tokyo, not just in Los Angeles but in Latin America."

"There's just one catch, and it's a big one," said Allen. "To be successful, the information superhighway must be built on a foundation of universal access and competition. By access, I mean that everybody who wants to provide content should have access to everybody who wants to buy it, and vice versa."

Reed Hundt, chairman, Federal Communications Commission, has said a guiding principle for the FCC's decision-making is creating access to markets. "We want to insure access for all citizens to competitively priced products and the social benefits of our networks," he said. "We want to insure that suppliers have access to their consumers. Wherever someone dominates a market, we want potential competitors to have access and entry to that market, so that monopolies will give way to competition."

"Today's problems in education, health care and job training can be directly

addressed and substantially solved by the capabilities of the information superhighway," said Hundt.

"The information superhighway is at the heart of America's future," said Ray Marshall, professor of public affairs at the University of Texas in Austin. "It will provide the path to improved education, health care, productivity, economic growth, and participation in community and public affairs. It's hard to imagine an undertaking with greater significance for the quality of our lives." ∎

What the Media Has to Say

Analysts say it's no coincidence AT&T's trophy case is sagging under the weight of quality awards. "AT&T is a lean, mean fighting machine," says Daniel Briere, president of TeleChoice consultants. What a turnaround. Just a decade ago, AT&T's future was uncertain. ... Analysts wondered whether a huge corporate bureaucracy could respond to nimbler competitors. It has. ... AT&T has emerged as the player to beat in telecommunications. Many analysts say it's leading the race to supply equipment and services for the information highway. ...

—USA Today, Oct. 19, 1994

AT&T has blown past rivals such as Northern Telecom to land orders of more than $15 billion for multimedia networking gear and systems integration services in the past year from several regional Bell companies.

—The Wall Street Journal, Oct. 6, 1994

"AT&T has the most advanced, most efficient long-distance network in the world," says Michael Arellano, a Northern Business consultant. "So customers are comfortable turning over these very complex new networks to them." ... "AT&T is really the only company out there that can offer a total network," says Andrei Jezierski, a telecommunications consultant at Booz, Allen & Hamilton Inc. Adds Charlotte Denenberg, SNET's vice-president for network technology: "AT&T is certainly the supplier of choice right now."

—Business Week, June 20, 1994

AT&T is fast becoming the prime contractor for the information highway. ...No competitor, including Alcatel of France, Siemens of Germany, or NEC of Japan, comes close. ...The company knows how to build and integrate huge high-tech systems, says Danny Briere, president of TeleChoice consulting firm. Plus, AT&T's systems are very flexible, Briere says. That's important when building networks for a multimedia market that doesn't yet exist and will evolve in unforeseen ways.
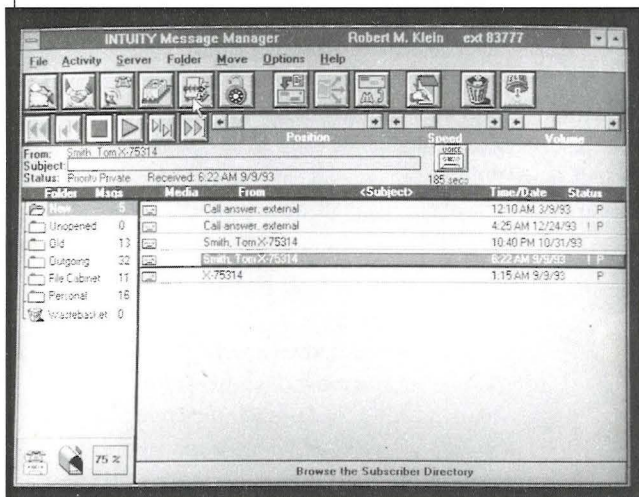
—USA Today, May 20, 1994

"AT&T has shown remarkable foresight, taking entrepreneurs into its business to help it evolve from a utility into a competitive high-tech company," said Berge Avazian, an analyst with the Yankee Group. "They now have all the pieces of the puzzle in-house." "Clearly, AT&T executives believe in the convergence of computers and communications and consumer electronics," said James Moore, a management consultant with Geopartners Research. "They will be involved in structuring this future in very important ways."

—Boston Globe, Aug. 19, 1993

"I think AT&T is just the unquestioned leader of a giant global growth industry," says Jack Grubman [now of Salomon Brothers]. "Every trend in the industry is working in their favor."

—The Wall Street Journal, Aug. 18, 1993